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A New White Smut.

While making a study of the parasitic fungi of the cultivated spinach (*Spinacea oleracea*,) it was a surprise to find a species of *Entyloma*, and especially as this host is so distant in the natural classification of plants, from any other host of a white smut. The infected leaves had lost all their normal green color and were of a pale yellowish white shade—in fact, presented much the same appearance as succulent foliage may take on after having been frost bitten some time before. Upon a closer examination, however, the surface of the whitened leaves was found coated in spots with a fine light substance that under the hand lens was seen to be in minute tufts. The low power of a compound microscope revealed these miniature rosettes as consisting of slender filaments bearing acicular bodies at their tips. Thin transverse sections of these infected patches showed small clusters of spherical spores imbedded in the leaf tissue, but close to the under epidermis. Further study demonstrated the fact that the clusters—each consisting of from a dozen to fifty spores, were located directly below the breathing pores and occupied the large intercellular spaces there found in the loosely constructed succulent leaf of the spinach. Placing a piece of the infected leaf, after being cleaned by alcohol and potash, with the underside uppermost and focussing, it was an easy matter to pass by optical sections from the highest part of the conidial bearing tuft to the center of the cluster of spores below. Carefully made sections through the breathing pores bearing the fungus illustrated the same disposition of the parts as seen in a side view. The threads of the fungus are exceedingly minute, and the conidia are so small and slender that they are easily overlooked unless high powers are employed. It gives me pleasure to dedicate the species to Mr. J. B. Ellis, who has done so much for the cause of mycological study in this country. The following is a description of the white smut of the spinach.

ENTYLOMA ELLISII. Spots pale white, indefinitely limited, sub-confluent; spores globose nearly colorless 16-20 μ in diameter, clustered in the intercellular spaces beneath the stomata. Conidia hypophyllous, abundant, acicular, small 10-14 by less than 1 μ . On cultivated spinach growing in hot beds near Newark, New Jersey, January 10, 1890.

The white smuts, or Entylomata, are neither numerous nor particularly destructive, as a rule, to their hosts, and if they are, it is often a blessing to the crop grower, for the hosts are mostly insignificant or weedy plants. Saccardo* enumerates thirty-six species, while Wintert† stops at half that number. The following are the species found in this country: *Entyloma microsporium*, Schrt. on *Ranunculus repens*.—*E. Thalictri*, Schrt. on *Thalictrum dioicum*. *E. Lobeliæ*, Farl. on *Lobelia inflata*. *E. Linariæ*, Schrt. on *Veronica peregrina*. This last species was found by the writer last autumn upon *Linaria vulgaris*, in New Jersey, and is probably the first time it has been thus met with in this country. An opportunity was therefore offered to compare this species (which agrees with foreign specimens kindly loaned me by Mr. J. B. Ellis) with the form so abundant upon and sometimes so destructive to the *Veronica peregrina*. As Entylomata go, there are some marked differences between the two; the most important of which are in the size and shape of the spores. Those upon the *Veronica* are darker and much larger than the typical form of the *Linaria*. While the latter has the spores $9-12\mu$ by $11-14\mu$ those of the *Veronica* are $12-15\mu$ by $17-20\mu$. The mature sori are consequently darker in the *Veronica*, and other differences are noticeable which, were the spores alike, might be accounted for, possibly, as host peculiarities. The *Entyloma* of the *Veronica* appears in early spring—a matter of necessity, as the host is short-lived—while the one upon the *Linaria* matures in autumn. There may not be sufficient ground for a separate species, but it seems proper that a form at least should be recognized as follows: *E. Linariæ*, forma VERONICÆ, nov. forma on *Veronica peregrina* with the differences as above stated.

Other American Entylomata are *E. Menispermī*, F. & T. on *Menispermum Canadense*; *E. Physalidis*, Wint. on *Physalis* sp. and *Solanum triflorum*; *E. polyspermum*, Fl. on *Ambrosia trifida*; *E. Saniculæ*, Pk. on *Sanicula Marylandica*; *E. Compositarum*, Fl. on *Aster puniceus*, *Ambrosia artemisæfolia* and *Rudbeckia laciniata*; and *E. Flærkeæ*, Holw., on *Flærkea proserpinacoides*.

It will be seen from the above that the spinach *Entyloma* is the

* *Sylloge Fungorum*, vii. pp. 487-496.

† *Die Pilze*, i. pp. 111-116.

only one in this country that has been found upon a cultivated plant. In Europe one species (*E. crastophilum*, Sacc) occurs on the orchard grass (*Dactylis glomerata*) while *E. Calendulæ* D.By. is sometimes met with upon the marigold (*Calendula officinalis*) and arnica (*Arnica montana*). The leading orders bearing white smuts are: Ranunculaceæ, Papaveraceæ, Compositæ, Boraginaceæ and Gramineæ, and the one upon the spinach, introduces a new host-order and one that at present is surrounded by those not known to contain any species attacked by an *Entyloma*.

BYRON D. HALSTED.

RUTGERS COLLEGE, March 24, 1890.

The New Edition of Gray's Manual.

Prof. Porter's criticism of the new edition of Gray's Manual, which was admitted into the last number of the BULLETIN, is written in a spirit so unworthy of him that self-respect on the part of the editors of the Manual would ordinarily forbid a reply. There are some statements, however, which I desire to make in relation to the work, some of which touch more or less closely upon points that Prof. Porter has referred to. As for most of the questions propounded by him, so far as I understand their bearing, anyone who has taken the trouble to read the preface will need little further answer.

The different editions of the Manual have contained the following numbers of pages: the first 782, the second 791, the third 746, the fourth 890, the fifth 742, and the sixth 818. The Mosses and Liverworts were included in all the previous editions excepting the third and fifth, the third and fourth including also the "Garden Botany." The Mosses, etc., were dropped from the fifth edition in the expectation that a supplementary volume would be prepared to cover them and perhaps other cryptogams. This hope has been fulfilled only in part by the publication of the Manual of Mosses by Lesquereux and James.

In the present edition, notwithstanding the extension of the territory, and with the inclusion again of the Hepaticæ, with other material which it seemed advisable to add, an effort has been made to avoid an increase in the bulk of the volume. Economy of space has been studied at every point where it was